
Chapter 3

Conveyance Policies

The RWSP conveyance policies are intended to guide King County on how to accomplish major improvements to the regional wastewater conveyance system through 2030 and beyond, including building and upgrading the pipes and pump stations associated with the Brightwater Treatment Plant. The policies call for the county to use the 20-year peak flow storm as the design standard for its separated wastewater system to avoid sanitary sewer overflows and ensure there is sufficient capacity in the regional conveyance system to accommodate planned growth. In addition, RWSP Wastewater Planning Policy (WWPP)-4 calls for facility sizing to take into account the need to accommodate build-out population. By 2050, the regional wastewater service area is projected to be fully built out and all sewerable portions of the service area will be connected into the wastewater system. Therefore, new conveyance facilities are designed to convey the 20-year peak flow event projected to occur in 2050.

The 20-year peak flow storm design standard was adopted by the King County Council to serve as an objective measure for designing and building conveyance facilities intended to meet National Pollutant Discharge Elimination System (NPDES) permit requirements.¹ The 20-year peak flow storm consists of both storm flow (infiltration and inflow) and base flow (wastewater from homes and businesses). It is projected to occur on average about every 20 years and to have a 5 percent chance of being exceeded in any given year.

Because no uniform capacity standard was in place before adoption of the RWSP, portions of the regional conveyance system do not currently meet the 20-year peak flow storm standard. In setting this standard, the King County Executive and King County Council recognized that it is one of the most stringent standards in the nation and that it would take some time for the conveyance system to be upgraded to meet this standard. RWSP policies, therefore, direct King County's Wastewater Treatment Division (WTD) to develop, in consultation with the Metropolitan Water Pollution

Types of Flow

Base flow is wastewater that enters sewers during dry weather in the absence of infiltration and inflow (I/I).

Infiltration is groundwater that seeps into sewers through holes, breaks, joint failures, defective connections, and other openings.

Inflow is stormwater that rapidly flows into sewers via roof and foundation drains, catch basins, downspouts, manhole covers, and other sources.

Peak flow is the highest combination of base flow and I/I expected to enter a wastewater system during wet weather over a set time period (for example, 30-minute increments).

¹ NPDES permits are issued by the Washington State Department of Ecology. The permits set limits on the quality and quantity of effluent (treated wastewater) discharged from point sources such as treatment plants, combined sewer overflows, and industrial facilities.

Abatement Advisory Committee (MWPAAC), parameters to guide project scheduling and prioritization for projects in the separated portion of the county's wastewater system.²

The conveyance policies call for the county to periodically evaluate population, employment, and development pattern assumptions in the planning of regional conveyance facilities, as well as to consider water conservation and demand management assumptions developed by local utilities. They also provide guidance to the county for assuming responsibility for component agency interceptors that meet certain criteria for becoming regional facilities. In addition, the policies direct the county to integrate water reuse planning and infiltration and inflow study results in the planning for conveyance facilities.

This chapter provides an overview of implementation of the RWSP conveyance policies from 2004 through 2006. In accordance with RWSP reporting policies, this chapter also includes a summary of the activities carried out in 2006 related to design and construction of Brightwater conveyance and other RWSP conveyance projects. The chapter concludes with summary information on amendments to the conveyance policies adopted by the King County Council in 2004–2006.

The complete text of all the conveyance policies, including information on policy amendments and a brief summary of how each policy was implemented in 2004–2006, is provided in Appendix B.

3.1 Implementation of Conveyance Policies from 2004 through 2006

This section provides an overview of the major activities carried out in 2004–2006 in accordance with the conveyance policies. The activities are as follows:

- Building Brightwater conveyance
- Updating the conveyance system improvement program
- Acquiring regional conveyance facilities

3.1.1 Building Brightwater Conveyance

The RWSP calls for King County to build and upgrade the pipes and pump stations needed to convey untreated wastewater (influent) to and treated wastewater (effluent) from the Brightwater Treatment Plant to a marine outfall for discharge to Puget Sound. In accordance with the conveyance policies, Brightwater conveyance is being built to meet the 20-year peak flow storm design standard; the system consists of approximately 14 miles of pipelines to be constructed in underground tunnels in north King County.

² MWPAAC advises the King County Council and Executive on matters related to reducing water pollution. It was created by state law (RCW 35.58.210) and consists of representatives from cities and local sewer utilities that operate sewer systems in King County.

Brightwater conveyance activities in 2004 and 2005 focused on predesign, permitting, land acquisition, initiation of final design, and negotiation of mitigation agreements. In 2005, a reclaimed water pipeline was incorporated into the design of Brightwater conveyance. Brightwater conveyance construction began in 2006, and is on schedule for completion in 2010. Information on the 2004 and 2005 activities was documented in the 2004 and 2005 RWSP annual reports.³ Details on Brightwater conveyance activities in 2006 are provided later on in this chapter.

3.1.2 Updating the Conveyance System Improvement Program

RWSP Conveyance Policy (CP)-3 directs the county to periodically evaluate assumptions regarding population and employment growth and development patterns in the planning of conveyance facilities.

Flow monitoring and modeling information developed for the Regional Infiltration and Inflow (I/I) Control Program allowed for a more accurate analysis of capacity needs in the regional conveyance system.⁴ This information served as the foundation for the process to update the conveyance system improvement (CSI) program, which occurred in 2005 and 2006. As a result, the *2007 Conveyance System Improvement Program Update* refines the previously identified conveyance needs; categorizes these needs based on system age, condition, or capacity; and presents a list of projects and a schedule to address identified needs.

The project needs identified in the CSI program update focus on facilities in the separated portion of the county-owned regional conveyance system. It does not cover projects in construction, such as Brightwater, nor does it cover component agency systems. However, the development of project scopes, costs, and schedules in the update assumes that Brightwater will begin operating in 2010.

This section provides background on conveyance planning that has occurred since adoption of the RWSP, describes the process used in the 2007 CSI program update, and lists the proposed recommendations related to future conveyance planning that emerged as a result of the process.

Background on Conveyance Planning

King County's regional wastewater system is a large, integrated wastewater conveyance and treatment system. The 34 cities and sewer districts that are component agencies of the system are responsible for collecting wastewater from residences and businesses. King County's over 335 miles of pipes and sixty-one pump and regulator stations convey this wastewater to three secondary treatment plants.

³ RWSP annual reports are available on the RWSP library Web site at <http://dnr.metrokc.gov/wtd/rwsp/library.htm>

⁴ A comprehensive six year I/I reduction study took place 2000-2005; as part of this study 800 flow meters were installed throughout the region in areas with separated sewers during the winter months of 2000-2001 and 2001-2002 (see Chapter 4 for more information)

Planning for the regional conveyance system is an ongoing function of WTD. WTD's CSI program is charged with planning conveyance improvements in accordance with RWSP policies to accommodate increased flows resulting from population and employment growth and to meet the 20-year peak flow storm design standard.

Since adoption of the RWSP, the approach to conveyance planning has undergone substantial reorganization, primarily to break down the service area into 10 sub-regional planning basins and to integrate conveyance planning with component agency plans and with other RWSP programs such as infiltration and inflow control. The CSI program was updated between 2000 and 2003 using this approach; the update was documented in the *2004 RWSP Update*.⁵

Significant new capacity needs were identified during development of the March 2005 *Regional Needs Assessment* (RNA) conducted for the Regional Infiltration and Inflow (I/I) Control Program.⁶ The purpose of the RNA was to identify CSI projects and costs that could serve as a baseline for conducting benefit-cost analyses of potential I/I reduction projects. The RNA identified 63 capital conveyance projects needed through 2050. These capacity-related projects included a combination of projects previously identified in the 1999 RWSP and the 2000–2003 CSI programs and additional projects identified based on extensive flow monitoring data, sewer population information obtained during the six-year comprehensive I/I study, and input from component agencies. (Chapter 4 provides more information on the county's I/I reduction program.)

The *Regional Conveyance System Needs Technical Memorandum* that was published in December 2005 and updated in March 2007 built on the RNA by re-evaluating capacity needs and reviewing age and facility inspection data on the condition of the conveyance system.⁷ The memorandum identifies the portions of the separated conveyance system that will need to be expanded or replaced over time in order to make the system capable of handling peak flow demands through 2050. It provided a basis for identifying and evaluating alternative approaches to address the identified needs and for seeking input from component agencies in the preparation of the 2007 CSI program update.

Identifying Regional Conveyance Capacity Needs

The process for identifying regional conveyance capacity needs through 2050 consisted of four main steps:

- Estimating current 20-year peak flow demands to establish a baseline that represents how the system currently performs during peak flow conditions
- Projecting 20-year peak flows by decade, through 2050, using population and employment growth projections
- Verifying and adjusting identified growth assumptions and capacity constraints using updated information from component agencies

⁵ The *2004 RWSP Update* is available on the Web at <http://dnr.metrokc.gov/wtd/rwsp/library.htm#compreview>

⁶ The RNA is available at <http://dnr.metrokc.gov/wtd/i-i/library/NeedsAssess/report.htm>

⁷ The technical memorandum is available at <http://dnr.metrokc.gov/wtd/csi/csi-docs/RegionalConveySysNeeds/index.htm>

- Using a hydraulic model of the conveyance system to identify capacity constraints based on where the current or projected 20-year peak flow exceeds the capacity of existing conveyance facilities

To project future wastewater flows, WTD uses population and employment forecasts provided by the Puget Sound Regional Council (PSRC). PSRC data are provided in two levels of detail—the more geographically broad forecast analysis zones (FAZ) and the more detailed traffic analysis zones (TAZ). To forecast wastewater flows, WTD uses the TAZ information and allocates the population estimated by TAZ to each of the county's wastewater hydraulic model basins according to the number of developed parcels in each TAZ and model basin. There are 150 model basins in the separated system and 320 model basins in the combined system. Adjustments are made to account for major employers and apartment complexes in the service area. Detailed basin delineations are done by marking the sewer areas, potentially sewer areas, and where development is not expected to occur.

In 2003, PSRC forecasted population for the Puget Sound region out to 2030. This information was used to update the original RWSP flow projections made in 1998, which were based on PSRC FAZ data from 1995; the updated projections were documented in the *2004 RWSP Update*. This updated data was also used in the development of the *CSI Program Update*.⁸ WTD staff will continue to update flow projections as updated PSRC TAZ information becomes available.

After projecting future flows and identifying capacity needs in the county's regional conveyance system, WTD staff met with representatives from the component agencies to present the identified needs and to obtain updated information from the agencies about local growth rates and other factors affecting conveyance capacity. The meetings resulted in a more common understanding of the basis for identified regional conveyance needs and incorporation of local conditions into the needs identification process. The flow projections and associated conveyance needs identified through flow modeling were, for the most part, consistent with component agency expectations. In some cases, information from an agency prompted changes in the estimated dates that 20-year peak flow volumes will exceed the capacity of regional conveyance facilities. The City of Issaquah, for example, provided information that demonstrates that the city is experiencing urban growth at a significantly faster rate than the rest of the region. The projected dates for needed improvements to the regional conveyance system in that area were adjusted accordingly and incorporated into the 2007 program update.

Thirty-three CSI projects were then identified to meet identified capacity needs through 2050; 24 of these projects are planned through the RWSP planning horizon of 2030. All 33 projects are in addition to the RWSP projects that are completed or that are in design or construction.

Figure 3-1 illustrates the process and inputs used to identify capacity needs in the county's separated conveyance system.

⁸ For details on how PSRC information was used to update the CSI program, see Appendix A, Conveyance System Technical Analyses – Processes and Assumptions of the CSI Program Update, <http://dnr.metrokc.gov/wtd/csi/library.htm>) More information about the PSRC population projections and their methods is available at <http://www.psrc.org/>.

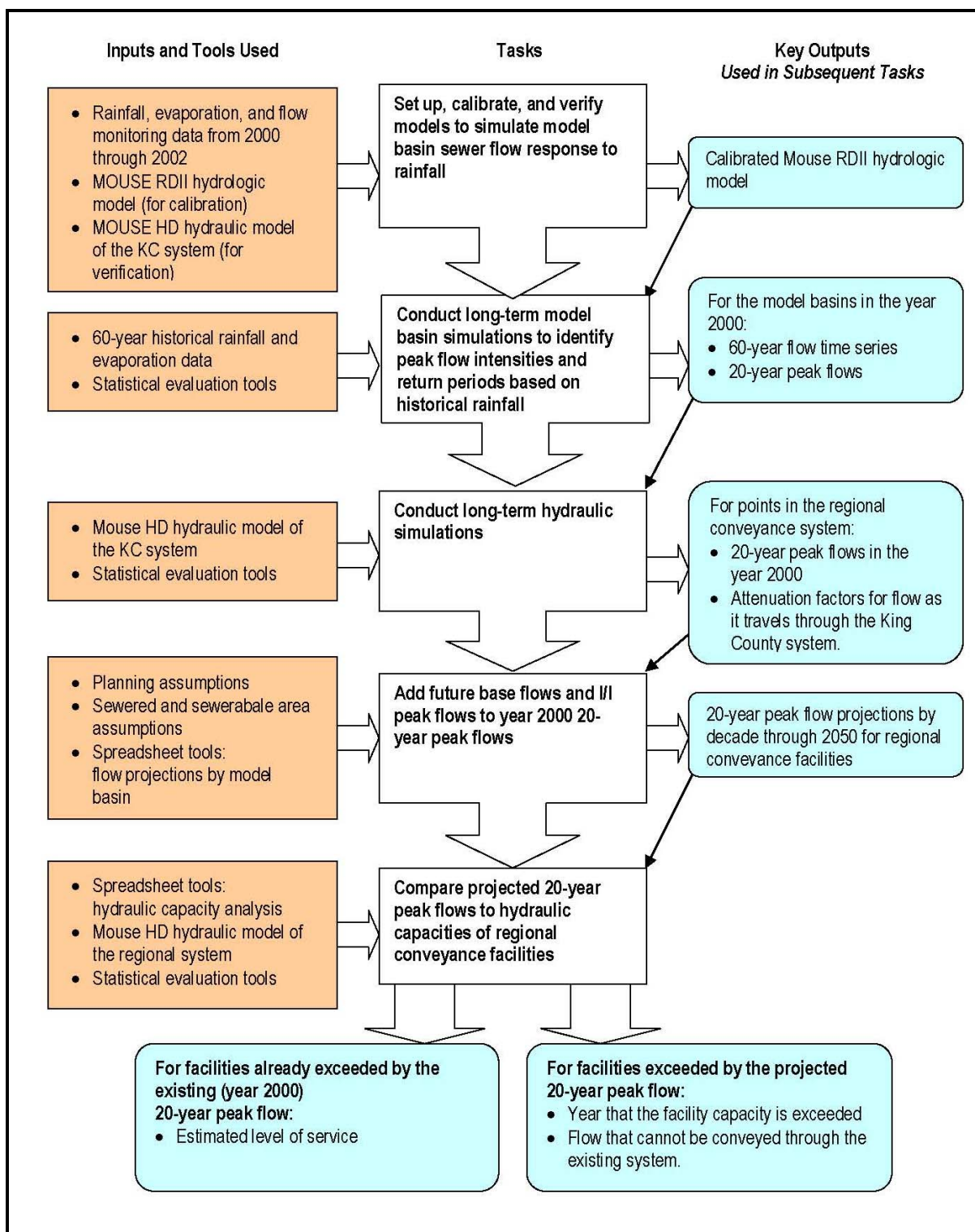


Figure 3-1. Process and Inputs for Identifying Capacity Needs in King County's Separated Conveyance System

Integrating I/I Reduction, Water Conservation, Reclaimed Water, and Climate Change in the Needs Identification Process

RWSP CP-5 directs the county to closely integrate and consider I/I study results, reclaimed water planning, and water conservation assumptions in wastewater facility planning. The two most significant factors that drive the need for expanding capacity within the regional conveyance system are infiltration and inflow and population and employment growth over time. I/I is clean stormwater and groundwater that enters the sewer system through cracked pipes, leaky manholes, or improperly connected storm drains, down spouts, and sump pumps. About 75 percent of the region's peak flows in the separated conveyance system comes from I/I.⁹ Flow volumes can quadruple during rain events when the conveyance system must handle base flow plus I/I (Figure 3-2). Based on flow monitoring data, it is estimated that ninety-five percent of the I/I that enters the regional system originates in privately owned side sewers and in component agency systems.

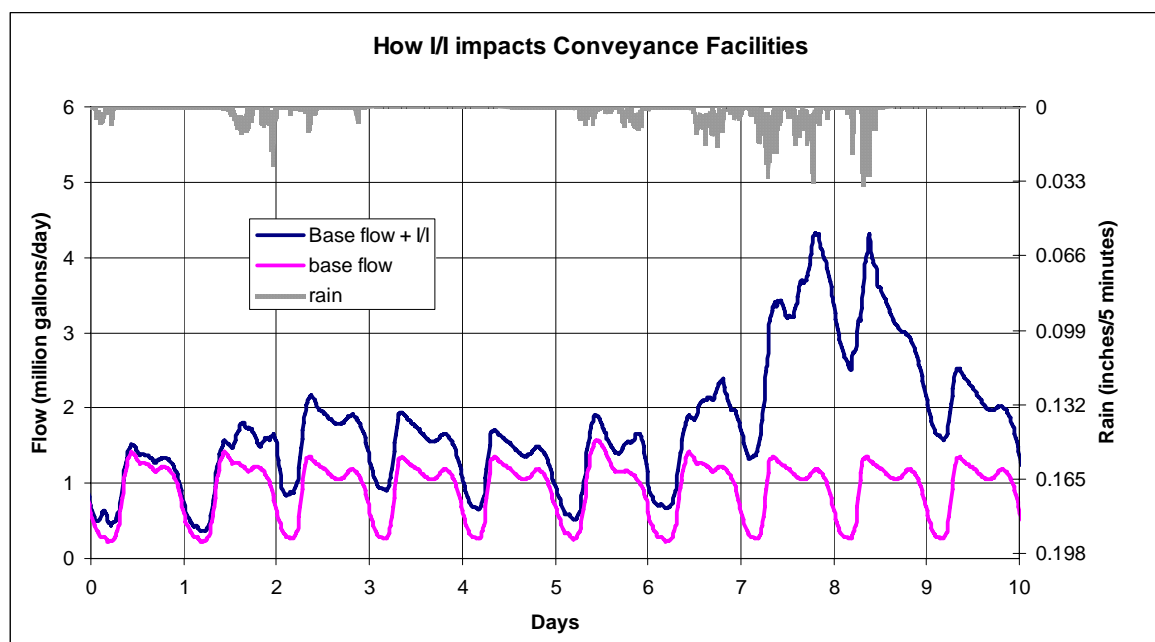


Figure 3-2. Typical Hydrograph Showing Impacts of I/I on Wastewater Flows

The *Executive's Recommended I/I Control Program* includes implementation of two or three initial projects to test the cost-effectiveness of I/I reduction on a larger scale than the pilot projects that were completed in January 2004.¹⁰ Each initial project, if successful, will eliminate the need for an identified CSI project. The goal is for the CSI program to invest in I/I reduction in lieu of investing in larger conveyance system improvements when it is cost-effective to do so. I/I reduction is considered cost-effective when the total estimated CSI project savings is greater than the total estimated cost of I/I reduction. The recommended capital improvements in the CSI

⁹ *Regional Wastewater Services Plan, Executive's Preferred Plan*, April 1998, page 14.

¹⁰ *Executive's Recommended I/I Control Program* was approved by the King County Council in May 2006 via adoption of Motion 12292, and is available at <http://dnr.metrokc.gov/wtd/i-i/library/ExecRec/report.htm>

program update will provide the basis for completing benefit-cost analyses for possible future I/I reduction projections. Chapter 4 provides more information on the I/I control program.

Water conservation assumptions are applied to flow projections and were used in the development of the CSI program update. For the update, the county used a water conservation planning assumption of a 10 percent reduction in per day consumption from the 2000 levels by 2010, with no additional reduction thereafter (Table 3-1). This is the same assumption used to update the 1998 RWSP flow projections in the *2004 RWSP Update*.

Table 3-1. Projected Water Consumption

Type of Consumption	2000 (Rate*)	2010 and Beyond (Rate*)
Residential (Seattle)	56	50
Residential (non-Seattle)	66	60
Commercial	33	30
Industrial	55	50

* Rates are shown in gallons per capita per day for residential consumption, and in gallons per employee per day for commercial and industrial consumption.

WTD staff will continue to review and monitor the water conservation assumptions of the City of Seattle and other utilities in the county's wastewater service area. For example, in spring 2007, the City of Seattle revised its water conservation assumptions and is now projecting greater conservation through 2010 and additional conservation between 2010 and 2020. WTD is in the process of analyzing Seattle's revised water conservation assumptions to determine the effect, if any, on future flow projections and facility needs.

The RWSP policies also call for integrating reclaimed water planning in the planning of conveyance facilities. During the process to update the CSI program, no reclaimed water planning efforts were under way or planned that might affect the flow projections used in updating the CSI program. WTD staff will continue to review component agency comprehensive plans to incorporate any evaluation of reclaimed water opportunities in those plans into wastewater facilities planning. Chapter 7 provides more details on the county's reclaimed water program and implementation of the RWSP water reuse policies.

The effects of climate change on the regional wastewater system are currently under investigation. Climate change may cause more intensive storm events, which could increase projections of peak wastewater flows for the system. Currently, precipitation models for our region that account for the affects of climate change are inconclusive. When more is known, they will be incorporated into existing models for projecting peak flows. WTD will be evaluating the effects of rising sea levels on existing and planned facilities. This information will be incorporated in future CSI program updates.

Using Criteria Developed in Consultation with MWPAAC to Prioritize CSI Projects

In addition to directing the county to use the 20-year peak flow storm as the design standard for the separated portion of the county's regional wastewater system, RWSP CP-1 also calls for the county to use parameters developed in consultation with MWPAAC to guide project scheduling and prioritization for regional conveyance projects.

As noted earlier in this chapter, the 20-year peak flow storm standard is one of the most stringent in the nation. In recognition that it is not technically practical or financially feasible to simultaneously construct all identified CSI projects necessary to bring facilities up to this standard, the King County Council directed the King County Executive to develop options for phasing or deferring non-Brightwater conveyance facilities anticipated for the 2006–2011 capital improvement plan, and in the 30-year RWSP capital plan (Ordinance 14942, Section 2F, adopted 6/17/04). In response to this directive, WTD and the component agencies worked collaboratively to identify and analyze alternative cost containment strategies. The alternatives analyzed included approaches to downsizing, phasing, or delaying construction of projects. Through this effort, it was determined that delaying or phasing project construction would be the best method of containing costs over time. Delaying projects would not reduce the overall capacity standard to be achieved and would allow WTD to focus on the region's most pressing conveyance needs with minimal risk to public health and the environment and with minimal impact to ratepayers.

To assist in identifying the most pressing conveyance system needs, WTD and MWPAAC developed eight prioritization criteria that address such factors as public health risks, coincident benefits, costs, and rate impacts. These prioritization criteria were submitted to the County Council in October 2004 in a report entitled *Prioritization Guidelines for Phasing Conveyance System Improvement Projects*. The criteria are as follows:

- Design new facilities to meet the 20-year peak flow expected by 2050.
Consistent with existing policy, providing one of the best levels of service for a wastewater utility in the country, by approximately 2020.
- Determine risk of overflow vs. peak capacity.
Analyze to determine if overflows are actually occurring or expected to occur vs. surcharging the system without causing overflows.
- Evaluate risk of public health and water quality issues.
Give highest priority to overflows that cause public health and/or water quality impacts.
- Identify operation and maintenance (O&M) issues and costs.
Analyze specific operation and maintenance costs and reliability in maintaining the system vs. upgrading the system.
- Determine the risk of regulatory non-compliance.
Apply results from overflow analysis and O&M reliability.
- Identify community and local agency concerns.
Coordinate with local agencies and review customer concerns or complaints.

- Evaluate coincident benefits.
Review state and local capital improvement program schedules to determine if partnering options are feasible and to minimize impacts to the affected community.
- Identify financing benefits.
Analyze opportunities to adjust schedules to better coordinate with grant and loan programs.

In accordance with RWSP CP-1, these criteria were applied to all planned CSI projects identified in the 2007 CSI program update. During this process, MWPAAC put a high priority on minimizing the potential for overflows in the regional conveyance system. The 2007 CSI program update (<http://dnr.metrokc.gov/wtd/csi/library.htm>) provides more detail on how these criteria were applied in the process to update the CSI program.

Table 3-2 lists the planned CSI projects in order of priority, and Figure 3-3 shows the location and priority of these projects.

Table 3-2. Identified Planned Conveyance Projects Through 2050

Project Planned through 2030	Estimated Range of Project Completion
Heathfield/Sunset Pump Station Replacement and Force Main Upgrade	2010-2013
Bellevue Influent Trunk Parallel	2010-2013
[CSI] Sammamish Plateau Diversion	2014-2030
Northwest Lake Sammamish Interceptor Parallel	2014-2030
Coal Creek Siphon and Trunk Parallel	2014-2030
North Mercer and Enatai Interceptor Parallels	2014-2030
Lake Hills Trunk Replacement	2014-2030
Thornton Creek Interceptor Parallel	2014-2030
Sammamish Plateau Storage	2014-2030
Boeing Creek Storage Expansion	2014-2030
Algona Pacific Trunk Stage 1	2014-2030
Richmond Beach Storage	2014-2030
Factoria Pump Station and Trunk Diversion	2014-2030
Soos Alternative 3A(3) – Pump Station D with Conveyance	2014-2030
Soos Alternative 3A(3) – Pump Station H with Conveyance	2014-2030
Soos Alternative 3A(3) – Pump Station B with Conveyance	2014-2030
Issaquah Storage	2014-2030
Eastgate Parallel Pipe Storage	2014-2030
Bryn Mawr Storage	2014-2030
Medina Storage	2014-2030
Issaquah Creek Highlands Storage	2014-2030
South Renton Interceptor Parallel	2014-2030
Issaquah Interceptor Section 2 Parallel	2014-2030
York Pump Station Modifications	2014-2030
Project Planned 2031–2050	Estimated Range of Project Completion
Swamp Creek – Section 1B Parallel	2031-2050
Garrison Creek Trunk Parallel	2031-2050
Juanita Bay Pump Station Force Main Upgrade	2031-2050
ULID 1 Contract 4 Parallel	2031-2050
Lower North Creek Interceptor Parallel	2031-2050
Algona Pacific Trunk Stage 2	2031-2050
Auburn Interceptor – Section 3 Parallel Pipe Storage	2031-2050
Upper North Creek Parallel	2031-2050
Lakeland Hills Pump Station Replacement	2031-2050

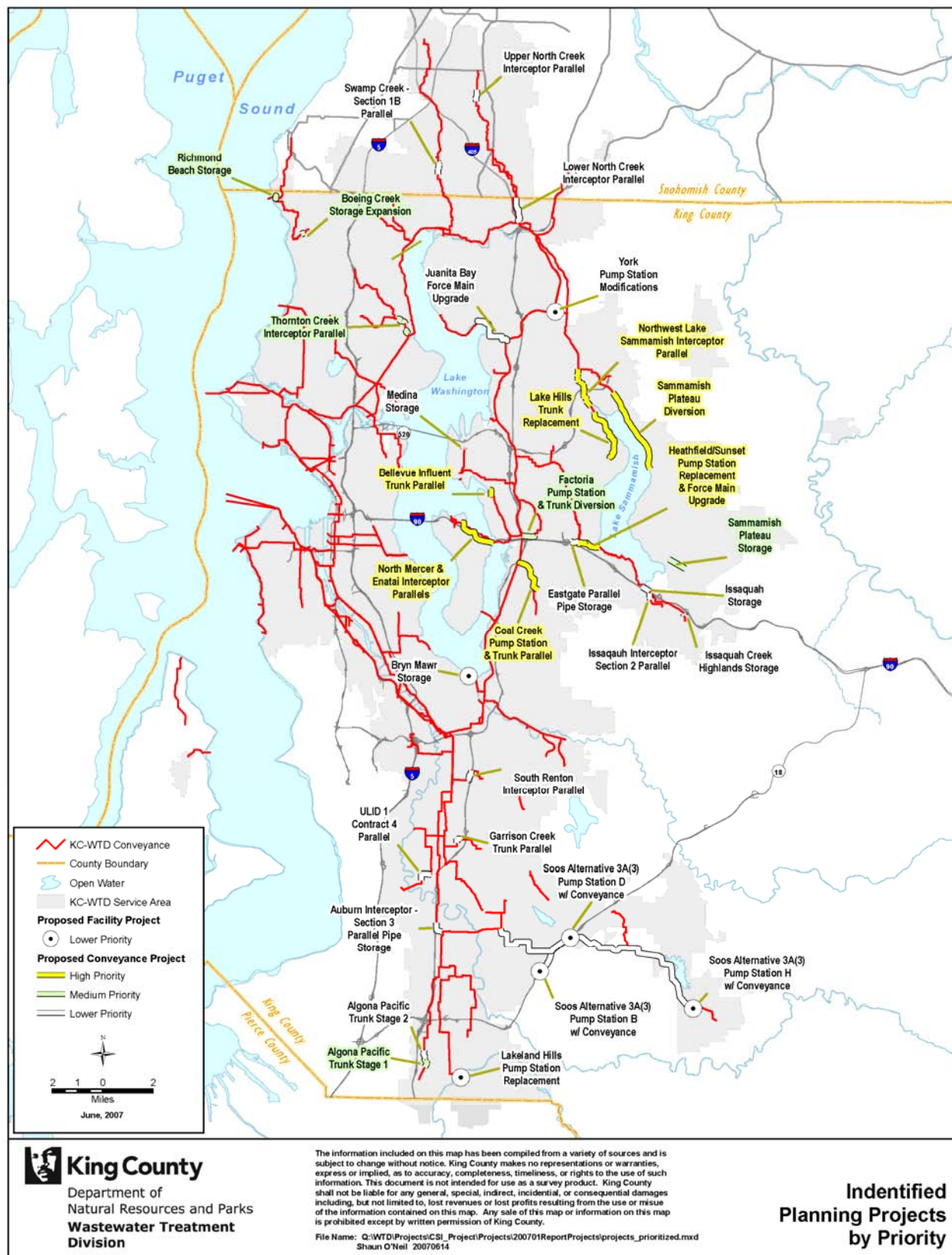


Figure 3-3. Identified Planned Conveyance Projects by Priority

Recommendations for Future Conveyance Planning

King County worked closely with MWPAAC, through its Engineering and Planning (E&P) Subcommittee, and individual component agencies during the process to update the CSI Program. In recognition of the fact that long-term management of the conveyance system is expensive and largely dependent upon projections of future flow volumes that are themselves based on projections of regional growth and weather patterns, several recommendations were made related to future conveyance planning. WTD will continue to work with MWPAAC on these recommendations; it is likely the King County Executive will propose formalizing these recommendations as conveyance policy amendments. The recommendations are as follows:

- To ensure the CSI program remains current, WTD should update the CSI program every five years beginning in 2013
- To ensure flow projections remain accurate, WTD should conduct systemwide flow monitoring to correspond with the decennial census of the population
- To avoid over-building the system, WTD should perform field verification of wastewater flows and conveyance component conditions prior to implementation of regional conveyance projects that are intended to address capacity needs
- To meet identified conveyance needs, WTD should evaluate other demand management alternatives, such as I/I reduction, water conservation, and reclaimed water facilities

For more information on the CSI Program, visit the program's Web site at <http://dnr.metrokc.gov/wtd/csi/>

3.1.3 Acquisition of Facilities

During the development of the RWSP, there was agreement among the Regional Water Quality Committee, the King County Council, and the King County Executive to establish uniform financing, construction, operation, maintenance, and replacement policies for all interceptors and trunks in its service area and for the county to assume responsibility for interceptors that meet the criteria outlined in RWSP CP-4. The criteria are as follows:

- County ownership and operation of permanent conveyance facilities that serve natural drainage areas of greater than one thousand acres
- Conformance to the county's comprehensive water pollution abatement plan and the RWSP as precondition of county ownership
- A financial feasibility threshold governing limitations of the county's financial contribution to development of a new interceptor or trunk sewer or acquisition of an interceptor or trunk sewer constructed by a component agency. The threshold, as specified in K.C.C. 28.84.080, shall consider the capital costs that can be supported by the existing customers in the natural drainage area that would be served by the new facility

In accordance with this policy guidance, the following acquisitions took place from 2004 through 2006:

- Acquisition of the Southeast Sammamish Interceptor and flow control structure from the Sammamish Plateau Water and Sewer District
- Acquisition of the Juanita Creek Trunk Sewer from the Northshore Utility District
- Acquisition of the Coal Creek Interceptor Extension from the Coal Creek Utility District

3.2 2006 Annual Report Activities of Conveyance Improvement Projects in Design and Construction

The RWSP reporting policies require the RWSP comprehensive review report to include all elements of the RWSP annual report, replacing the annual report for the year that the comprehensive review report is produced. The RWSP annual report provides information on RWSP capital projects in design and construction. This section meets the 2006 annual report requirements for Brightwater conveyance and the following non-Brightwater conveyance projects that are in design or construction:

- Bellevue Pump Station Upgrade
- Kent/Auburn Conveyance System Improvements
- North Creek Interceptor Improvements
- Hidden Lake Pump Station Replacement and Sewer Improvement
- Fairwood Interceptor Sewer
- Black Diamond Storage Facility
- Juanita Bay Pump Station Replacement
- Pacific Pump Station Replacement

Figure 3-8 (on page 3-20) shows the locations of the non-Brightwater conveyance projects in design and construction during 2006.

3.2.1 Brightwater Conveyance

The Brightwater conveyance system includes the pipes and facilities that bring influent to the Brightwater plant and effluent from the plant to a marine outfall for discharge to Puget Sound. The system consists of approximately 14 miles of pipelines to be constructed in underground tunnels in north King County. The tunnels will be constructed in three segments (east, central, and west), as shown in Figure 3-4.

Other facilities needed for the conveyance system include pumps, flow and odor control facilities, and electrical and monitoring equipment. Many of these facilities will be below ground. There will be a larger pump station building at the North Creek portal site in Bothell, and smaller aboveground structures at some of the other portal locations.¹¹

In addition, the Brightwater reclaimed water pipeline is being constructed in conjunction with the construction of the Brightwater conveyance tunnels.

Chapter 2 provides information on the activities and accomplishments in 2006 related to construction of the Brightwater Treatment Plant. Information on updated cost trend estimates of the Brightwater system is also included in Chapter 2.

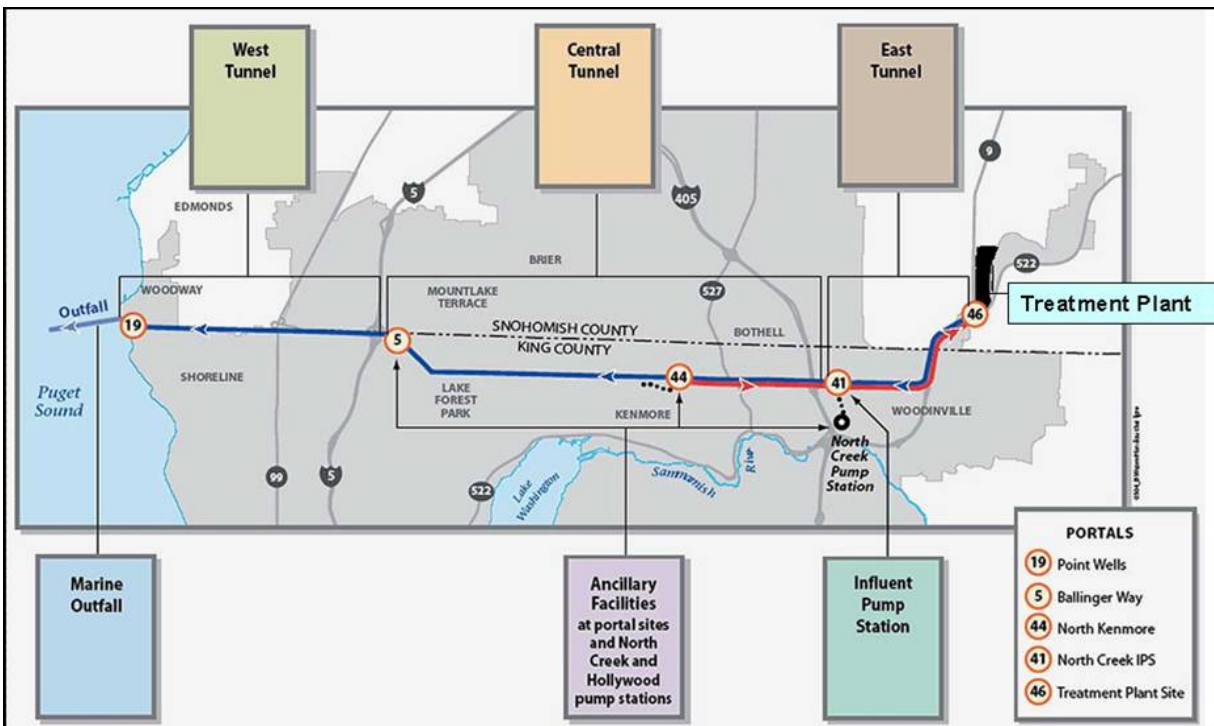


Figure 3-4. Components of the Brightwater System

Overview of 2006 Accomplishments

King County made substantial progress on Brightwater conveyance in 2006. The Brightwater project is on schedule for completion in 2010. Brightwater conveyance accomplishments in 2006 include the following:

- **East Conveyance Tunnel.** Construction began on the Influent Structure/Influent Pump Station shafts at the North Creek Portal. Through 2006, the contractor completed excavation of the Influent Structure (IS) shaft and began constructing the Influent Pump

¹¹ Portals are the access shafts where workers, machines, equipment, and soils will enter and exit the tunnel during construction.

Station (IPS) shaft slurry wall panels. Figure 3-5 depicts construction activities associated with the Influent Pump Station (IPS) and Influent Shaft (IS).

Anticipated activities in 2007 include pouring a slab at the base of the IS, dewatering the IS shaft, and completing IPS shaft slurry wall panels.



Workers use a hydromill trench cutter to excavate the slurry walls for the Influent Pump Station



Workers cleaning the walls of the Influent Structure Shaft

Figure 3-5. Influent Pump Station and Influent Shaft Construction Activities

- **Central Conveyance Tunnel.** In 2006, construction began on the tunnel shafts at the North Kenmore Portal. Sound walls were constructed and excavation of the slurry wall panels began. Figure 3-6 depicts construction activities associated with the North Kenmore Portal.

Anticipated activities in 2007 include constructing a slurry wall for the North Kenmore shaft, excavating the Swamp Creek Connector jacking pit, and constructing the diversion structure and open-cut pipeline along NE 192nd Street.



Workers construct rebar cages for the slurry walls at the North Kenmore Portal site

Figure 3-6. North Kenmore Portal Construction Activities

- **West Conveyance Tunnel.** In late 2006, the county selected a joint venture contractor for the West Tunnel. The contract was signed in January 2007. Activities anticipated in 2007 include site development at the Point Wells Portal site and procurement of the tunnel boring machine.
- **Influent Pump Station.** Design was completed on the Influent Pump Station (IPS) and construction bids were advertised in late 2006.
- **Marine Outfall.** In December 2006, King County received statements of qualifications from five teams for the marine outfall design-build project. Final selection of the design-build team is expected in summer 2007.¹²
- **Brightwater Reclaimed Water Backbone.** In 2006, design was completed on the Brightwater reclaimed water pipeline. Construction bids were advertised for the reclaimed water pipeline from the Brightwater IPS to the North Creek Pump Station. Design was also initiated on converting the existing pipelines from the North Creek Pump Station to the York Pump Station and on the final section of new reclaimed water purple pipe from the York Pump Station to Willows Run Golf Course. The location of the Brightwater reclaimed water system is shown in Figure 3-7.

Activities anticipated in 2007 include completing the design and State Environmental Policy Act (SEPA) work associated with the pipelines from the North Creek Pump Station to the York Pump Station and from the York Pump Station to Willows Run Golf Course, completing property easements and acquisition, and obtaining construction permits.

- **Permitting.** All conveyance permits for tunnel construction, local connections, North Creek facilities, and for the section of the reclaimed water pipeline from the Brightwater IPS to the North Creek Pump Station were finalized in 2006. Agreements were obtained for 146 of the 147 conveyance easements for the conveyance tunnel.

¹² The selected contractor will be responsible for completing the project design, construction, and installation of the outfall.

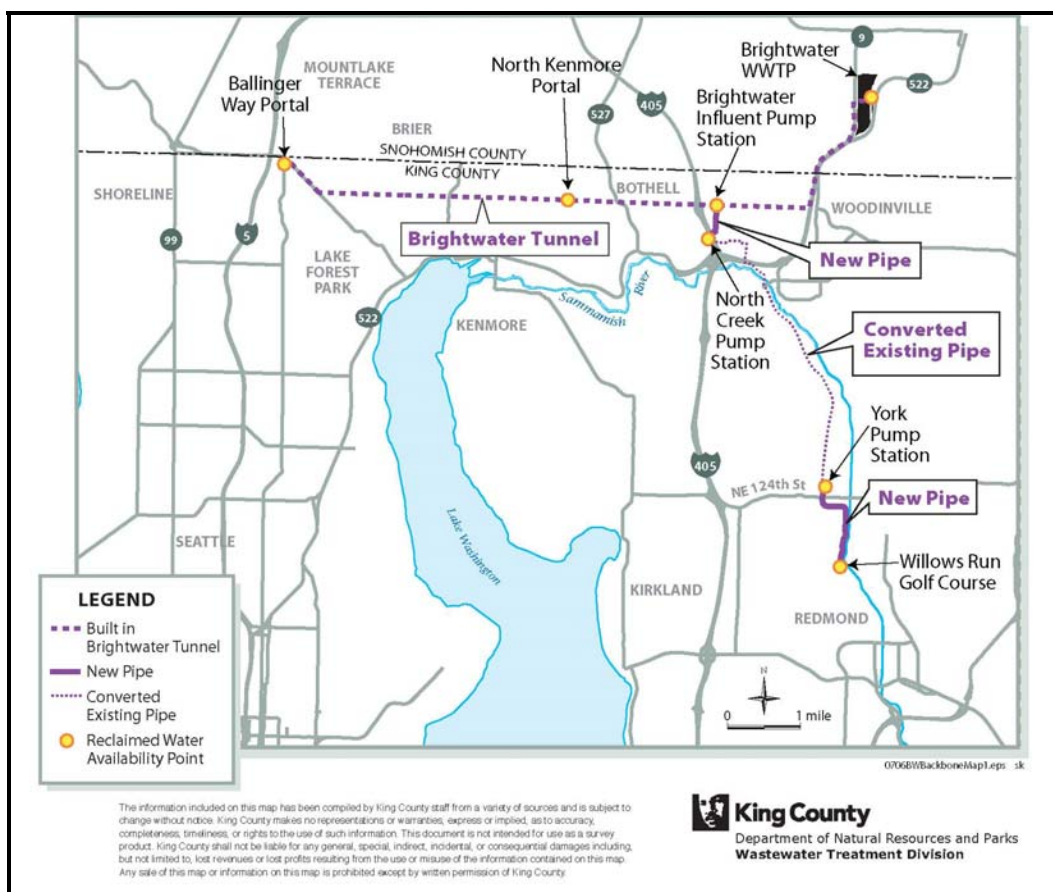


Figure 3-7. Brightwater Reclaimed Water Backbone System

- Public Involvement.** WTD continues to place a high priority on involving stakeholders and members of the public in Brightwater design, permitting, and construction. Over 35 meetings and briefings with residents, community leaders, and groups were held in 2006, including informational meetings and open houses for community members who live or work near the conveyance portal areas and treatment plant. Brightwater informational booths were available at several community fairs, festivals, and public events.

A groundbreaking ceremony took place in April 2006 to celebrate the start of construction on the Brightwater project and to thank all of the jurisdictions, consultants, contractors, and individuals who have been a part of the project through planning, siting, design, permitting, and now construction.

The Brightwater project team continues to respond to questions and comments received on the project from property owners, jurisdictions, neighbors of future facilities, and the general public. In addition, the team produced project newsletters, bulletins, and news releases to keep people informed about project activities.

Visit the Brightwater project's Web site for more information:

<http://dnr.metrokc.gov/wtd/brightwater/>

3.2.2 Bellevue Pump Station Upgrade

The Bellevue Pump Station needs to be upgraded to handle growing wastewater flows from the Bellevue area. Built in 1964, the facility pumps about 8 million gallons per day (mgd) of wastewater to the Swayolocken Pump Station near the Mercer Slough. From there, the wastewater is piped to the county's South Treatment Plant in Renton. The Bellevue Pump Station Upgrade project will increase the Bellevue Pump Station's firm capacity to 11 mgd to meet projected flows in the future and will improve the station's electrical and control systems.¹³

The pump station improvements include new pumps; new electrical, mechanical, and odor control equipment; a new standby generator; new aboveground facilities to house the new equipment; and better access for maintenance vehicles and workers. In addition to these improvements, a new 5,500-foot-long, 24-inch-diameter force main will be constructed to convey the added flows directly from the upgraded Bellevue Pump Station to the East Side Interceptor. Because of space constraints, the Swayolocken Pump Station cannot be upgraded to handle these additional flows.

Project design was near completion by the end of 2006. All project-related permits and easements were obtained in 2006. The project will be implemented through two construction contracts: one for the force main and one for the pump station. The construction bids for the force main were received in January 2007; construction is expected to begin in spring 2007. The pump station contract is expected to be advertised in November 2007 and will be awarded in early 2008. The project is on schedule for completion in 2010.

Visit the project Web site for more information: <http://dnr.metrokc.gov/wtd/projects/bellevue/>

¹³ Firm capacity means the capacity of the pump station with one of the larger units out of service for maintenance or repair needs.

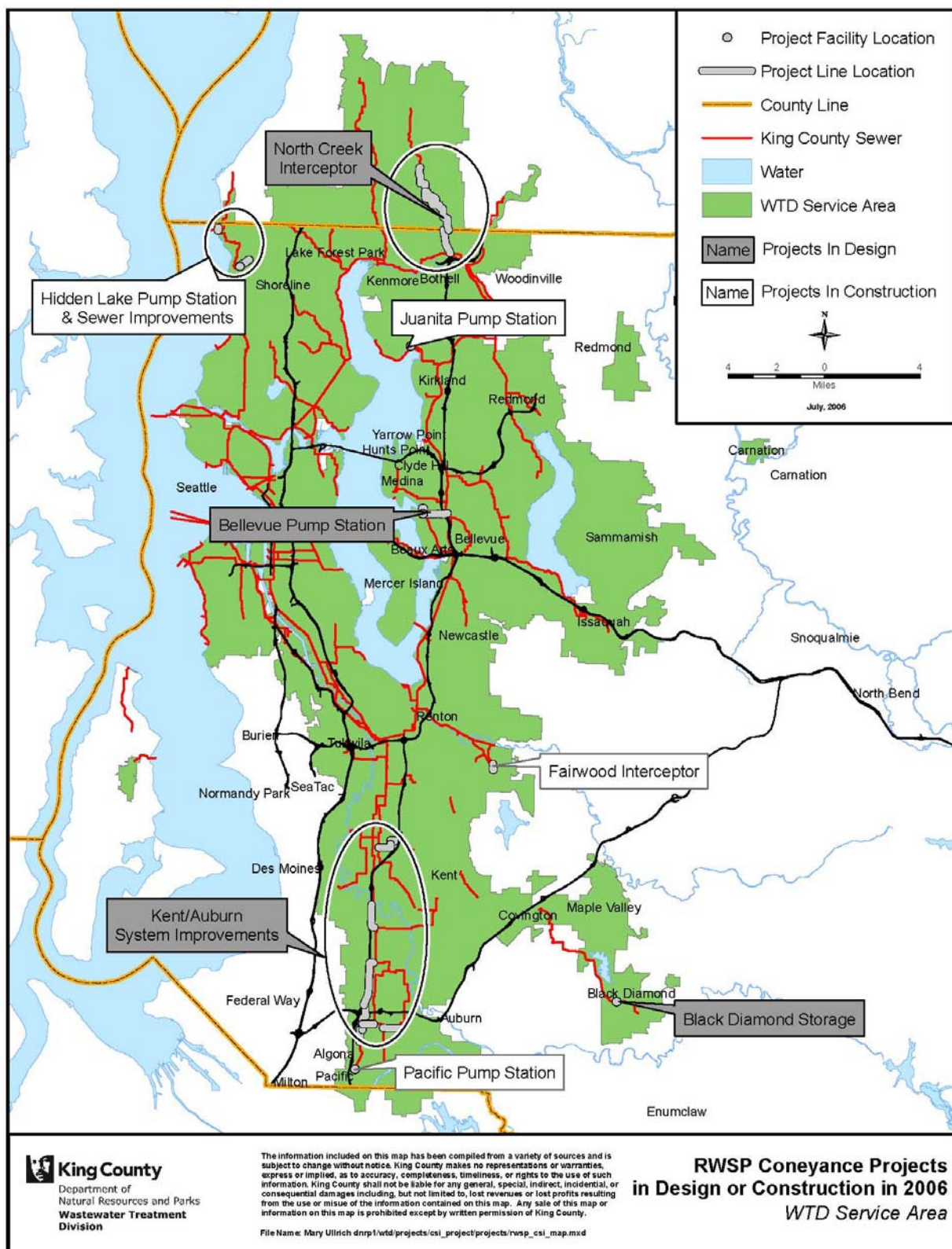


Figure 3-8. RWSP Conveyance Projects in Design and Construction in 2006

3.2.3 Kent/Auburn Conveyance System Improvements

The Kent/Auburn Conveyance System Improvements will provide additional capacity needed in the cities of Kent, Auburn, Algona, and Pacific. To meet these needs, the county is looking at constructing approximately five miles of new pipe, ranging from 18 to 54 inches in diameter. This project was formerly known as the Southwest Interceptor project, which proposed to meet the capacity needs in the Kent and Auburn planning areas by rerouting flows to a new large-diameter sewer located primarily in the West Valley Highway right-of-way. As a result of the information gathered during the I/I control study, the planning analyses were revisited. It was determined that the capacity needs were lower than originally projected and that the revised capacity needs could be met with construction of fewer miles of sewers compared with the original Southwest Interceptor. In addition, it was determined that it would be most cost-effective to build the new sewers in phases based on capacity needs. A number of alternative approaches were evaluated. In 2006, WTD staff met with staff from the cities of Auburn, Kent, Algona, and Pacific to help determine the preferred locations for the pipelines associated with the Kent/Auburn Conveyance System Improvement project.

The proposed solution to meeting the capacity needs in the Auburn planning area involves three project elements:

- **Pacific Pump Station Force Main.** Located in Pacific, Algona, and Auburn, this new pipeline will carry flow north from the Pacific Pump Station to the Auburn West Interceptor.
- **Stuck River Trunk.** Located in Auburn, this new gravity pipeline will be constructed to convey flow away from the M Street Trunk to the Auburn West Interceptor.
- **Auburn West Interceptor Parallel or Replacement.** Located in Auburn, this new gravity pipe will either replace or parallel an existing portion of the Auburn West Interceptor between 15th Street Southwest and West Main Street in Auburn.

Two project elements are proposed for meeting the capacity needs in the Kent planning area:

- **Kent East Hill Diversion.** Located on the East Hill of Kent, this new gravity pipe will divert flow out of the upstream portion of the Mill Creek Interceptor and into the South 277th Interceptor.
- **Kent ULID 1/5 Interceptor Parallel or Replacement.** Located north of downtown Kent, this new gravity pipe would either replace or parallel portions of the existing interceptor along 4th Avenue North between approximately State Route 167 and South 212th Street.

Predesign is expected to be complete in October 2007. During predesign, it is possible that modifications will be made to these project elements.

Visit the project Web site for more information: <http://dnr.metrokc.gov/wtd/projects/Kent-Auburn/index.htm>

3.2.4 North Creek Interceptor Improvements

Improvements to the North Creek Interceptor are necessary to avoid overflows and meet current and future growth needs in the North Creek basin. This project is located within unincorporated Snohomish County and the City of Bothell and consists of constructing 16,400 feet of gravity sewer pipes, ranging from 21 to 48 inches in diameter, to replace the existing sewer pipes.

King County has signed an interlocal agreement with the Alderwood Water and Wastewater District to provide design and construction management services to this project. King County WTD staff is providing overall project management and oversight to the project.

In 2006, activities focused on predesign and permitting activities. Final design began in late 2006 and is expected to be completed in the third quarter of 2007. Construction is expected to begin in late 2007. The project is scheduled for completion in 2010.

3.2.5 Hidden Lake Pump Station Replacement and Sewer Improvements

The 40-year-old Hidden Lake Pump Station does not have capacity to handle existing or future peak storm flows, nor does it meet current design standards for odor control, instrumentation, and equipment handling. Further, the pump station discharges to the Boeing Creek Trunk, which has a history of capacity, odor, and corrosion problems. This project will address these problems through new facilities to control overflows and increase the capacity of the Boeing Creek Trunk to meet the 20-year peak flow storm design standard.

This project is located in the City of Shoreline and includes constructing a new Hidden Lake Pump Station on the site of the existing pump station, replacing approximately 12,000 feet of the Boeing Creek Trunk, and building a 500,000-gallon underground storage pipe in Boeing Creek Park.

The pipelines will be constructed by open-cut and microtunneling. The pump station will be constructed by conventional aboveground methods. The new pump station will have a pumping capacity of 6.8 mgd; the existing pump station's capacity is 4.3 mgd. Designed with public input, the new pump station will fit in the neighborhood and include native landscaping.

Activities in 2006 included selecting a construction contractor; issuing a notice to proceed in the spring; and beginning construction in the summer. A 12-foot-diameter storage pipe was installed in Boeing Park, and site preparation and construction of the pump station foundation were completed. Construction is expected to be complete in 2009.

WTD staff is working closely with nearby residents and businesses to keep them informed of construction activities. Notice of activities is provided via mail, e-mail, phone, and door-hangers. Project updates and newsletters are widely distributed and posted on the project Web site. In addition, the county holds community briefings and open houses, and works directly with affected community members to problem-solve project-related concerns. WTD has established a 24-hour construction hotline for people to call with questions or concerns.

In addition, WTD staff is coordinating with the City of Shoreline, Ronald Wastewater District, and the City of Seattle to minimize community impacts. Because of this coordination, it has been possible to keep Boeing Creek and Richmond Beach parks open during construction. The county is also replacing 5,000 feet of water mains owned by Seattle Public Utilities as well as replacing existing and constructing new manholes and sewer pipes for the Ronald district as part of this project.

Visit the project Web site for more information:

<http://dnr.metrokc.gov/wtd/projects/hiddenlake.htm>

3.2.6 Fairwood Interceptor Sewer

This project replaced the erosion-prone and unstable Madsen Creek sewer pipeline that served the Fairwood community with a new deep gravity Fairwood Interceptor Sewer, located in a new alignment outside the Madsen Creek ravine. The new alignment follows Fairwood Boulevard for several blocks from the Fairwood Elementary School to the Bonneville Power Administration's right-of-way near 140th Avenue SE. It includes an inverted siphon underneath the west Madsen Creek tributary. In accordance with community preference, the new interceptor avoided the need to build a pump station in Fairwood. This project included improvements to existing Cedar River Water and Sewer District pipelines.

Construction of the final phase of the project began in 2005. Activities in 2006 focused on completing the final phase of the project:

- Microtunneling the final new sewer segment from the end of the inverted siphon sewer in the Bonneville Power Administration's right-of-way to the existing sewer installed along 140th Avenue Southeast
- Installing the new pipeline along Fairwood Boulevard from the 15th fairway at the Fairwood Golf and Country Club to the Fairwood Elementary School playfield using underground microtunneling
- Upsizing sewer pipelines along 167th Place SE from the cul-de-sac to 155th Place SE using open-cut construction
- Upsizing sewer pipelines along Southeast 166th Place between 162nd Avenue SE and 157th Avenue SE at the playground using open-cut construction

The final phase of the project was substantially complete in December 2006, and the new interceptor began operating at that time. Final activities, such as restoring roads, sidewalks, and public rights-of-way that were disturbed by project construction were complete in spring 2007.

Throughout the life of the project, WTD staff have been working closely with the project's affected neighbors and surrounding community to keep them informed about construction impacts and respond to their questions and concerns.

Visit the project Web site for more information: <http://dnr.metrokc.gov/wtd/projects/fairwood/>

3.2.7 Black Diamond Wastewater Storage Facility

Planning for the Black Diamond Wastewater Storage Facility began in 2006. This project will meet the near-term capacity needs in the Black Diamond area, extend the life of existing equipment, and defer the need to build additional major new pump stations and sewer pipelines for several years.

This project will design and construct approximately 600,000 gallons of underground wastewater storage to be located in the City of Black Diamond. In 2006, activities focused on preparing and advertising a request for proposal and selecting a design engineer for the facility.

The county is working closely with the City of Black Diamond on this project. Activities in 2007 will focus on predesign, including siting and preliminary sizing and configuration of the facility. Construction is scheduled to begin in 2009; the facility is expected to be operational in 2010.

3.2.8 Juanita Bay Pump Station Replacement

The existing 14.2-mgd Juanita Bay Pump Station is an aging facility that is experiencing significant operational difficulties in conveying existing flows and that has insufficient capacity to convey future flows. To meet flow demands projected through 2050, a 30.6-mgd pump station is being built to replace the existing station. In addition to increased capacity, the new pump station will include features to improve safety and reliability, such as a standby generator, odor and corrosion prevention systems, improved access for maintenance vehicles and workers, and equipment lifting devices. The existing and future pump stations are located at the intersection of NE Juanita Drive and 93rd Avenue NE in Kirkland.

Construction began in September 2005. Progress made in 2006 includes the following activities:

- Building a network of temporary pumps and wells extending 90 feet underground to stabilize groundwater on the site during construction
- Drilling more than 80 interlocking concrete secant piles 70 feet into the ground to hold back soil during excavation and to serve as the pump station foundation
- Tunneling under NE Juanita Drive to install a new sewer line 40 feet beneath the road

Throughout construction, project staff has worked closely with the surrounding neighbors and community to keep them informed about construction activities and to respond to their questions and concerns. Fliers and e-mail alerts are distributed to update community members about construction activities. A 24-hour project construction hotline has been established; staff respond promptly to questions or concerns received on the hotline. In addition, the project Web site is updated on a regular basis.

Plans for 2007 include completing the pump station foundation and building and starting to install the pump station with mechanical and electrical equipment. The new pump station is expected to begin operating in spring 2008.

Visit the project Web site for more information:
<http://dnr.metrokc.gov/wtd/projects/juanita/index.htm>

3.2.9 Pacific Pump Station Replacement

As of December 2006, the Pacific Pump Station Replacement project is substantially complete. The project constructed a new Pacific Pump Station and a gravity sewer and force main, replacing the 1.6-mgd underground Pacific Pump Station that had insufficient capacity to convey existing and projected future peak flows. The new 3.3-mgd pump station was constructed in an industrial zone two blocks west of the existing station. It was built with features such as standby power, odor control, reliable and safe access for operational and maintenance staff, and equipment lifting devices.

Activities in 2006 focused on completing construction and on conducting testing and startup activities. Visit the project Web site for more information:
<http://dnr.metrokc.gov/wtd/projects/pacific/index.htm>

3.3 Amendments to Conveyance Policies

In September 2006, the King County Council approved amendments to the conveyance policies via adoption of Ordinance 15602. The amendments are as follows:

- Clarified that the design standard for the county's separated system is the "twenty year peak flow storm" in place of "twenty year design storm"
- Added direction for the county to use parameters developed by WTD in consultation with MWPAAC as a guide to project scheduling and prioritization for separated conveyance projects
- Provided criteria for the financing, development, ownership, operation, maintenance, repair and replacement of conveyance facilities
- Added language directing the county to consider water conservation and demand management assumptions in its planning of wastewater facilities